Geology of the Dysart No. 1 Mine, Ambrosia Lake Area

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INTRODUCTION

The Dysart No. 1 mine site is in the northwestern part of the Ambrosia Lake area in the SW¼ sec. 11, T. 14 N., R. 10 W. [N.M.P.M.]

The mine was one of the first sandstone-type deposits in the Ambrosia Lake area to be opened up and is now mined out. Final production was completed in April, 1961. During the life of the property nearly 900,000 tons of ore were produced at an average grade of .21 percent U_3O_8. Maximum production was approximately 1500 tons per day on a two-shift basis. All workings were completely dry.

The mine was developed by 7 x 15-foot drifts on 70-foot centers leaving 55-foot pillars and on 35-foot centers leaving 20-foot pillars. The particular spacing depended upon ground conditions. After complete development the pillars were quartered, extracted, and the unsupported ground allowed to cave behind the line of retreat.

GEOLOGY

The Dysart No. 1 mine shaft collars in the Mancos Shale and bottoms in the lower part of the Westwater Canyon Member. The Westwater Canyon Sandstone, which is 120 to 140 feet thick, was the host rock for the uranium ores at the Dysart No. 1 mine.

The Dysart No. 1 mine lies on the northern flank of the Ambrosia Lake anticline. The mine is a segment of the trend of ore that starts in the eastern part of the SE¼ of section 10, and extends across the southern half of section 11 and into the southwestern part of the adjacent section 12.

The uranium ores were chiefly black with only minor occurrences of secondary uranium ores. There were minor occurrences of molybdenum minerals which were noted in most instances on the fringes of the ore. The color was bluish black and at first sight was confused with the black uranium ore but could be distinguished by its slight bluish cast combined with a low gamma-ray count. A few occurrences of native selenium were found mostly in the southeastern area of the mine.

The ore bodies were generally elongated in an east-west direction with one notable exception, a small north-south ore body in the east-central part of the mine (fig. 1). This ore body was stratigraphically high in the Westwater and was very narrow in relation to its length. The ore body followed north-south fractures and these had yellow uranium mineralization. Some cut-and-fill sedimentary structures also coincided with a north-south trend.

The area to the northwest of the shaft was the most complicated as far as multiple zones of ore were concerned. This area presented not only problems in stoping but earlier problems in interpretation of the ore zones from surface drilling.

The earliest drilling indicated that ore occurred at many different elevations and extreme difficulty was encountered in correlating ore zones from one hole to the next even when holes were drilled as close as 100 feet. As development extended from the shaft, it became evident that the uranium deposit had considerable continuity. It was found that many ore intercepts in adjacent holes, although of different elevations, were the same ore zone and could be mined as a continuous ore body. Up to this time lithologic information from drill holes was meager, especially since electrical resistivity or self-potential logging methods had not been used.

In late 1957, a new drilling program was commenced. These holes were logged not only for gamma radiation data but for resistivity and self-potential data as well.

It was recognized that with good resistivity data, ore horizons could be correlated in most cases within a few feet vertically. This was sufficiently accurate to be of great value in solving many immediate mining problems as well as correlating ore zones in preparation for long-range development.

In this area four separate ore zones were finally defined by surface drilling data and underground development work. The four zones are A, B, C, and D in descending order and are shown in Figures 2, 3, 4, and 5, respectively.

Zone A, which was the uppermost zone, occurs in the upper part of the Westwater Canyon Sandstone near the Brushy Basin Shale. This zone strikes east-west over most of its length but swings to the southwest along the western edge. Zone A dips north from 5° to a maximum of 30°. This zone was developed and followed by drifts for 1900 feet along the east-west trend of which about the first 800 feet is shown here. This zone varies more than 20 feet stratigraphically.

Zone B, stratigraphically below Zone A, is generally along the southern border of Zone A. The strike of Zone B was just north of west and dipped to the north on an average of 5°. Zone B was considerably smaller in aerial extent than Zone A but elevationwise it extended approximately 20 feet above the lower edge of Zone A going down to just about the lowest limit of Zone A. Its limited distribution is such that it is not present in the cross sections A-A′ and B-B′ of Figures 6 and 7.

Zone C just below Zone B had a strike generally north of west, but swung slightly east of north in the western part. This zone dipped north about 9°. Stratigraphically this zone varied about 20 feet from south to north; it was about the same elevation as Zones A and B on its southern edge but was somewhat lower than A and B on its northern edge. It may be readily seen that this zone, with some elevations about the same as Zones A and B and dipping under the other zones could complicate the interpretation of drillhole information. It could have been interpreted as more steeply dipping ore zones or nearly flat ore zones.

Zone D, the lowest zone in this area, was unusually long and narrow. Although Zone D had no clear-cut mappable features it followed a sinuous course in plan and had considerable bottom undulations which suggested that the ore fol-

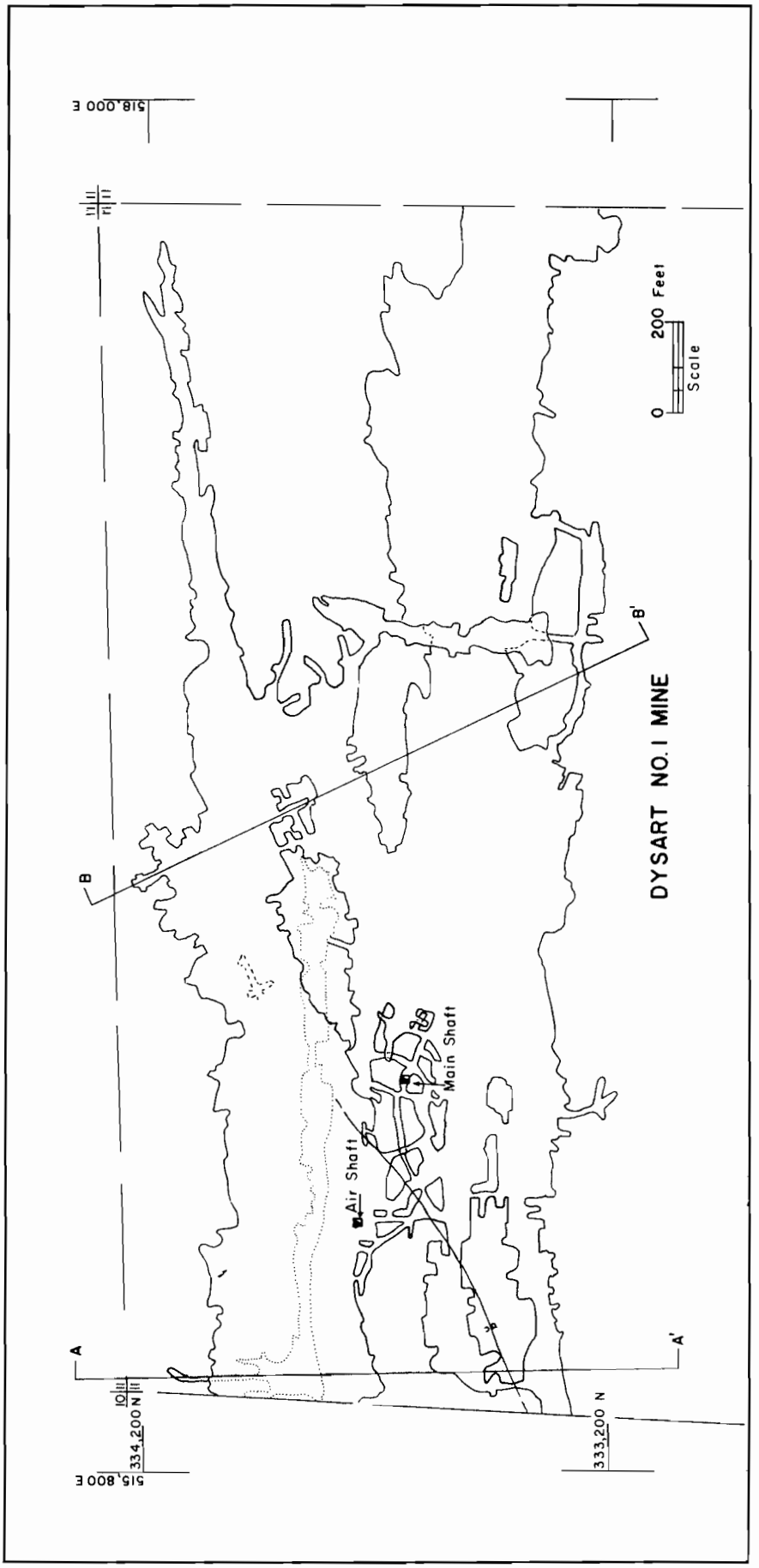

Figure 1

PLACE MAP OF THE DYSART NO. 1 MINE, MAIN WORKING. LOWER WORKINGS IN ZONE D SHOWN IN DOTTED OUTLINE.

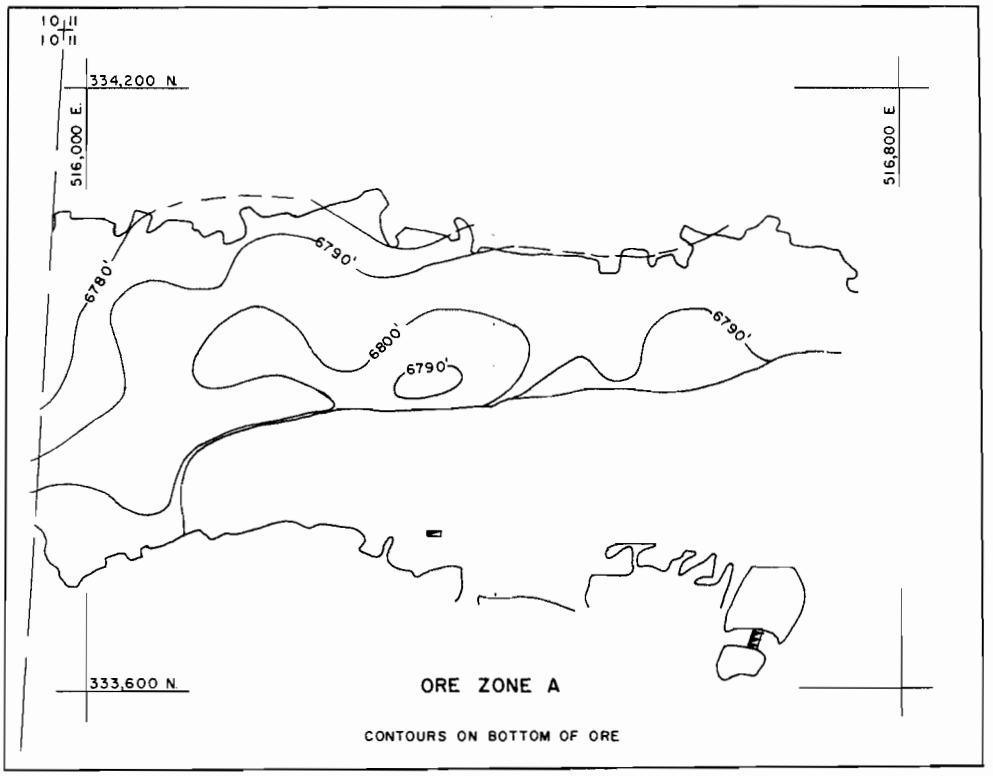

Figure 2

PLAN MAP OF ORE ZONE A

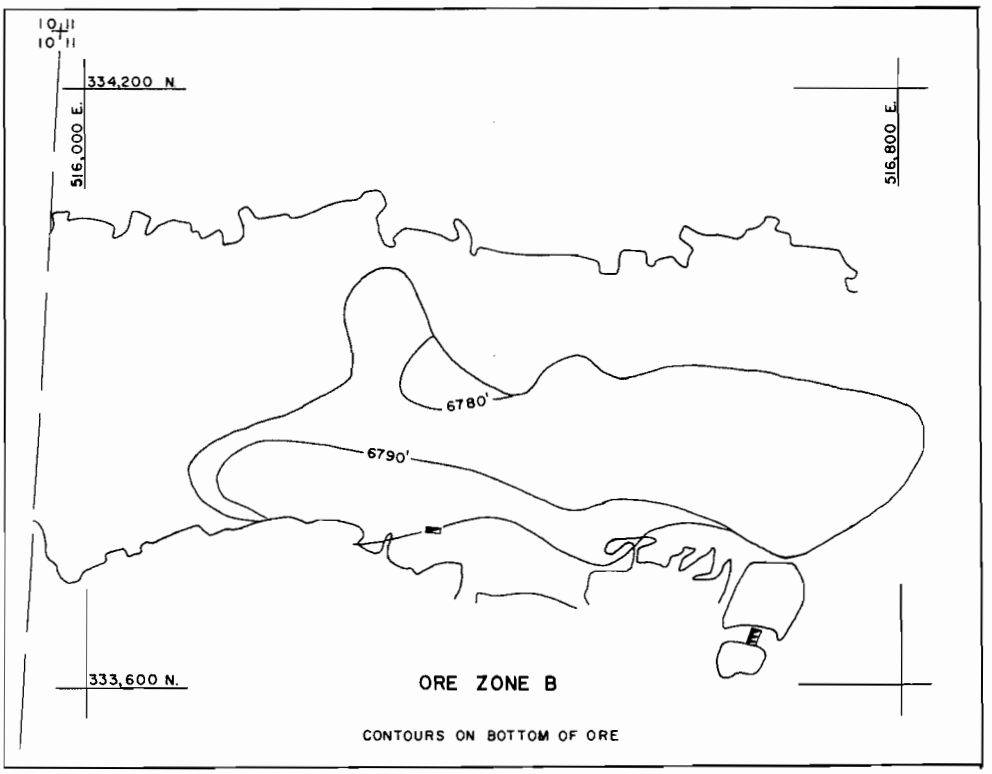

Figure 3

PLAN MAP OF ORE ZONE B

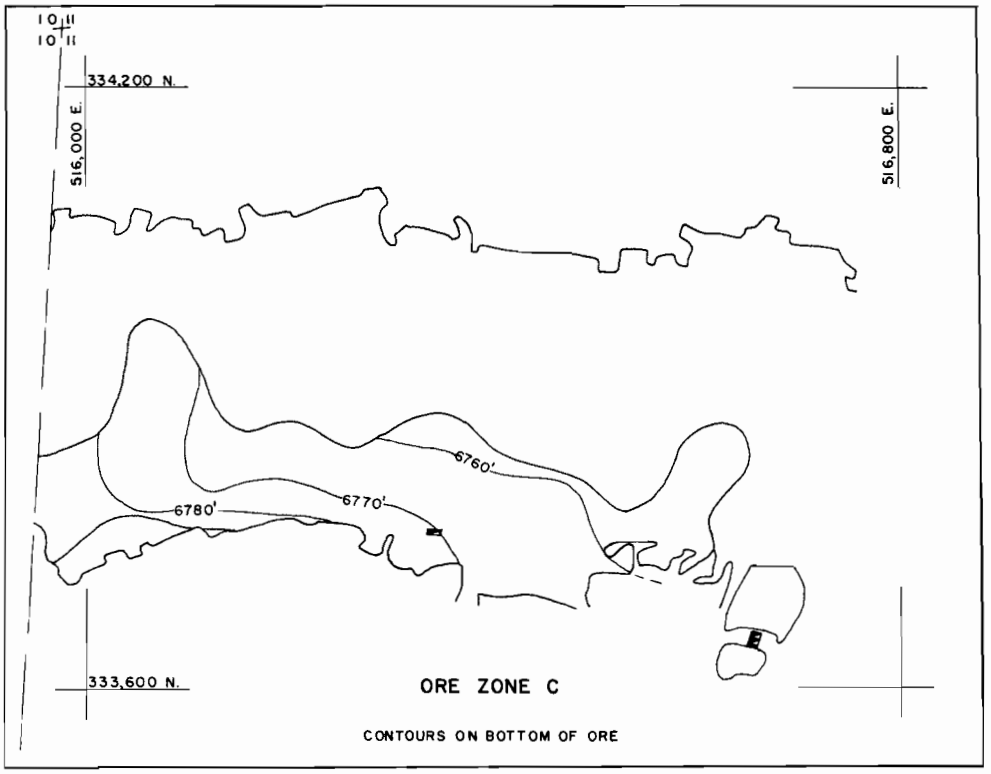

Figure 4

PLAN MAP OF ORE ZONE C

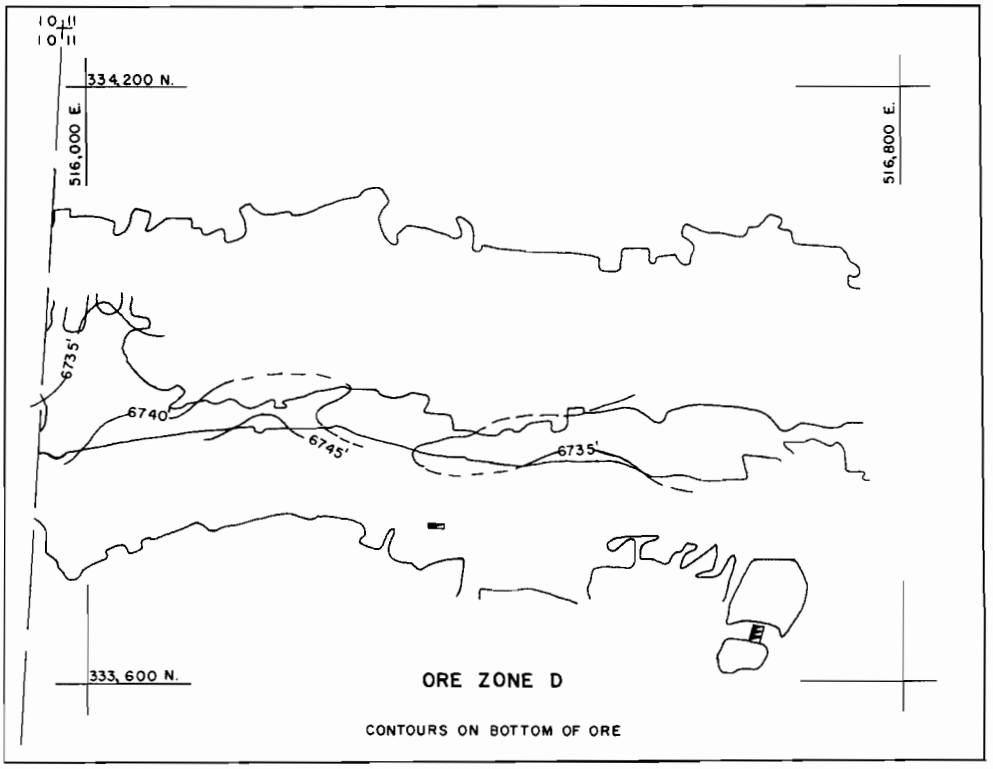

Figure 5

PLAN MAP OF ORE ZONE D

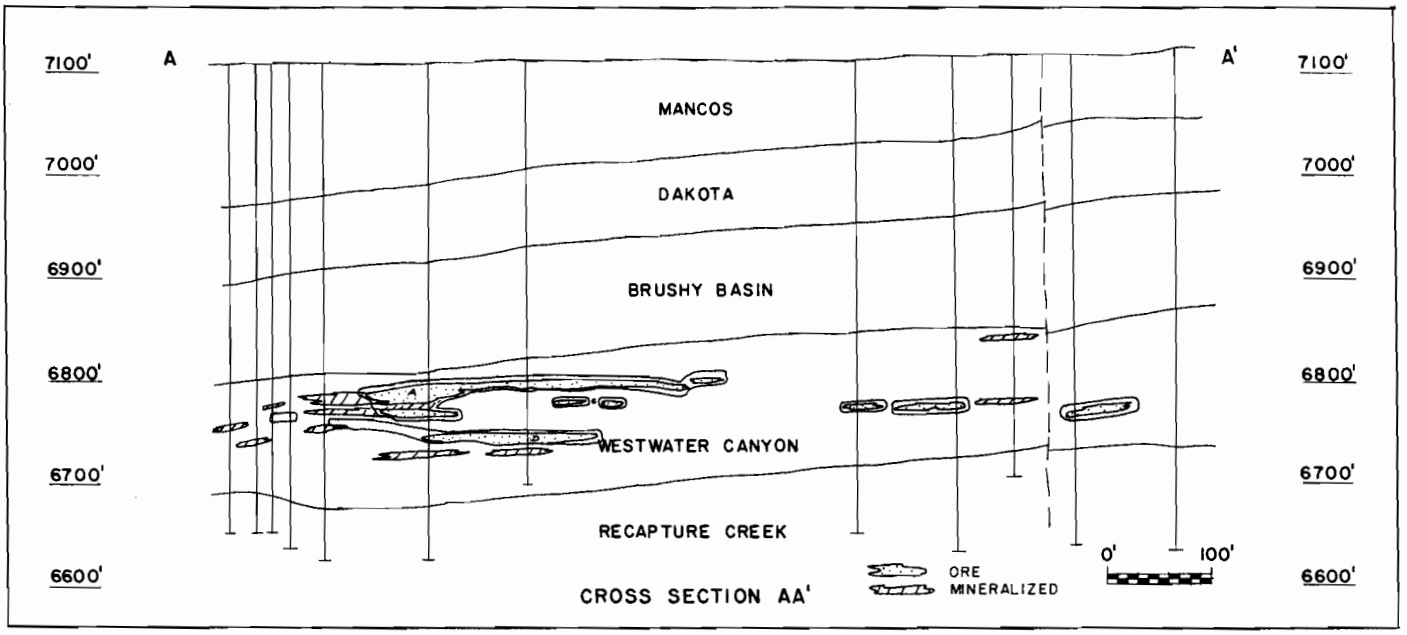

Figure 6

CROSS SECTION OF THE WESTERN SIDE OF THE DYSART NO. 1 MINE

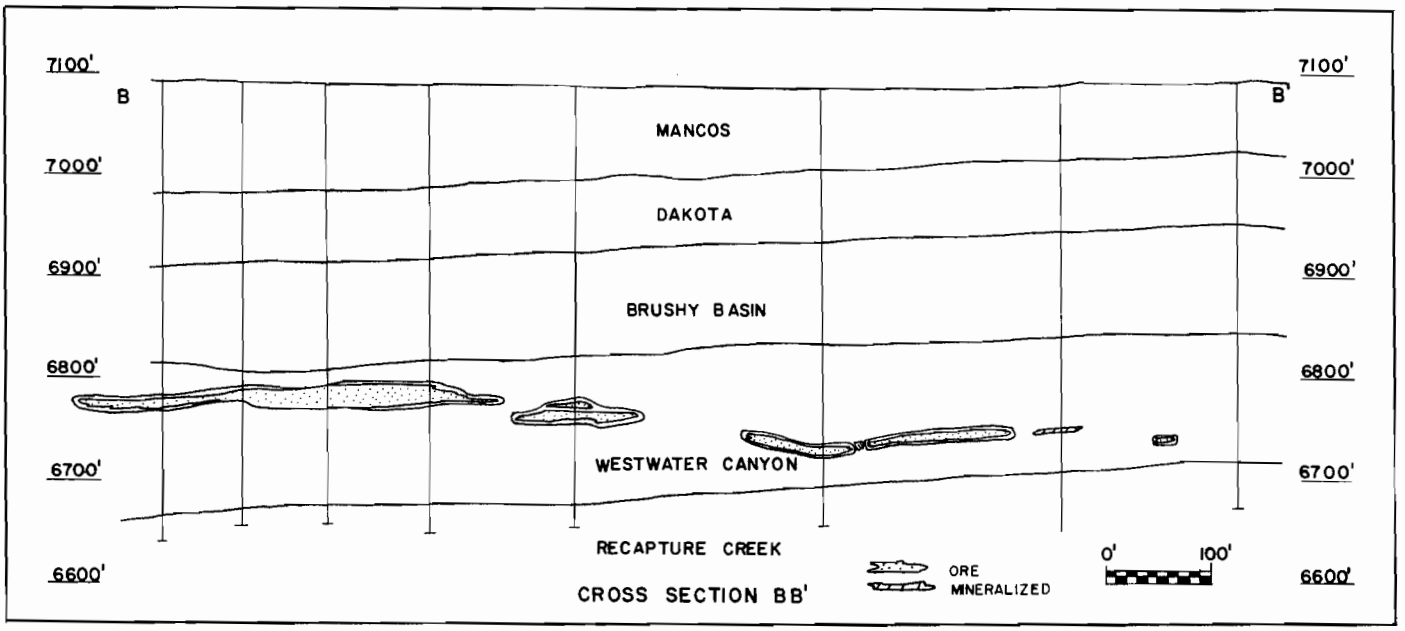

Figure 7

CROSS SECTION OF THE CENTRAL PART OF THE DYSART NO. 1 MINE

lowed a sandstone channel. This zone is shown (dotted outline) in Figure 1.

Cross section A-A (fig. 6) shows some of the thick ore occurrences that occurred in areas north and east of the main shaft. Cross section B-B (fig. 7) shows some of the thick ore occurrences that occurred in areas north and east of the shaft. The thick ore shown in the western half is the extension of Zone A, but the presence of exact equivalents of Zones B, C, and D in this area is uncertain.

There was only one major fault in the mine that had a considerable extent. This fault is shown in the southwestern area of the mine (fig. 1). It strikes northeasterly and dips to the southeast at a high angle. In the southwest the throw was estimated at ten feet or more, but as the fault was traced to the northeast the throw decreased. In the area northwest of the shaft the fault faded out and could not be traced farther. Underground observations, in few exposures where the fault crossed an ore zone, the ore was apparently faulted.

There were numerous exposures of festoon sedimentary structures. These had a gross west to east trend, in the direction of the mine workings. Therefore it would seem a natural conclusion that the direction of sedimentary transport was a factor in determining the trend and shapes of the ore bodies.

In detail the mineralization did not conform to sedimentary features. In some instances the ore followed bedding, and at other places cut sharply across the bedding at high angles with sharp ore-waste interfaces. In other instances the boundaries were gradational. Often the ore followed shale bands and erosion surfaces strewn with clay galls, but at other times there was no apparent bounding material.